

February 2, 2007

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**RE: Notice of Intent for the NPDES Permit for Storm Water Discharge**

The Municipality of Carolina owns and operates a separate storm sewer system (MS4), and therefore is required to obtain a permit as described in the Phase II of the National Pollutant Discharge Elimination (NPDES) Regulations.

Attach you will find the Individual NPDES Permit Application for the Municipality of Carolina, under the 40CFR 122.33 (c)(1), and the Storm Water Management Program, developed for our urban area.

Sincerely yours,

  
Plan. Carmen Quiñones Barbosa  
Director  
Planning Department

Commonwealth of Puerto Rico  
Autonomous Municipality of Carolina



Notice of Intent  
Storm Water Management Program

Prepared By:  
Planning Department  
February 5, 2007

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Autonomous Municipality Of Carolina*

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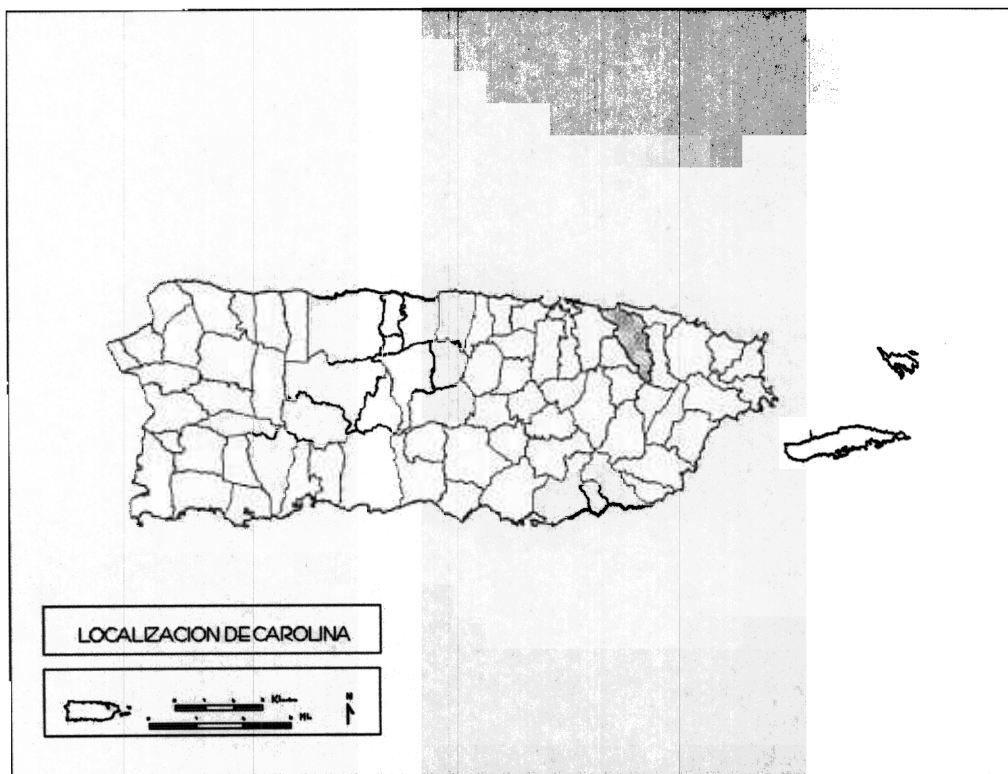
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## Scope

Under the provisions of the Clean Water Act (33 U.S.C. 1251 et seq.), as amended, Federal Law prohibits discharges of pollutants in storm water without a National Pollutant Discharge Elimination System (NPDES) Permit. According to the Storm Water Phase II final rule published in December of 1999, small municipal separate storm sewer system (MS4) owners and operators must reduce pollutants in storm water to the maximum extent practicable (MEP) to protect water quality. As an operator of a small MS4, the Municipality of Carolina is required under Phase II final rule to obtain NPDES permit coverage and submit a Storm Water Management Program.

This Program describes the goals and measures that will be taken to assess the problem of pollution in water bodies of the Municipality of Carolina due to stormwater runoff through the municipal separate storm sewer system. The purpose of the Program is to minimize the discharge of possible pollutants in the stormwater sewers in order to protect water quality for the residents of Carolina.

### Location of Carolina

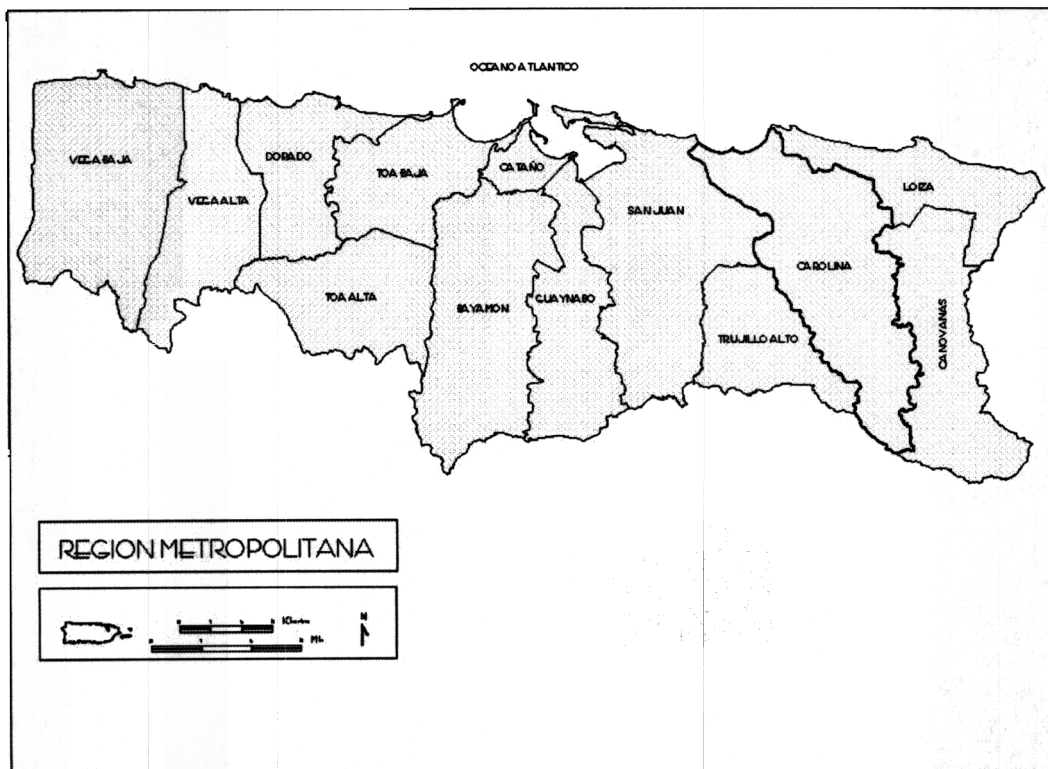




## Introduction

The Autonomous Municipality of Carolina has a land area of 45.4 square miles and lies in the eastern border of the San Juan Metropolitan Region, the most densely populated segment of the island. The urban center of Carolina, established in 1857, was constructed following the Spanish tradition of a central square (plaza) surrounded by series of blocks (plots). From the late 1940's to the 1970's Puerto Rico's economy suffered a major transformation. An economy based mainly on agricultural activities changed to one centered on industries, promoted mostly by economic incentives sponsored by the State Government.

### Metropolitan Region of San Juan



The inauguration of the Luis Muñoz Marín International Airport at Carolina 1954 encouraged the development of the manufacturing and tourism industries; promoting also, as a result of the economic growth, the fast development of urban neighborhoods. Carolina lost valuable agricultural land to development and actually has more than 45 neighborhoods, 3 mayor commercial centers and 17 industrial parks. The Storm Water Management Program (SWMP) of the Municipality of Carolina comprehends the urban area, which has an extension of 13.8 square miles.



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The urban area of Carolina is affected by pollutants that reach the water bodies through the storm sewers. Rainfall can wash nutrients, metals, oils, and other substances from urban impervious surfaces such as roads, sidewalks, and parking lots into surface waters. The concentration of contaminants in this runoff depends on the extent of the source, the type of contaminant, the intensity and duration of the storm and the timing between storms. Highest contaminant concentrations are generally found in the first flush of runoff that is generated at the beginning of the storm (SJBEP, 2000).

In addition to sewage discharges, typical pollutants released to surface waters from stormwater runoff include petroleum hydrocarbons (e.g., oil, gasoline and greases) from vehicles, marinas or port facilities, and pesticides, fertilizers, metals, sediments and pollutants related to certain industrial processes and practices. Metals (copper, cadmium, zinc, lead and nickel) are also significant pollutants normally washed from paved surfaces (Horsley & Witten Inc., 1995).

## **Legal Authority**

Act No. 81 of August 1991, known as the Autonomous Municipality Act, empowers local governments to promulgate regional land use plans. Since 1992, the Municipality has an approved Territorial Plan, which gives Carolina an autonomous with regional authority to act in terms of land use planning. The Public Works Department, among other "responsibilities, manages the construction and maintenance of storm water inlets and sewers, and also gets involved in maintenance dredging and debris removal of open channels and certain water bodies within the urban area, though their involvement is limited due to the Department of Natural and Environmental Resources (DRNA, in Spanish) jurisdiction over all water bodies of Puerto Rico.

The Municipality of Carolina has stipulated a public policy regarding the improvement of the environment and the quality of life in stressed areas and instituted the Office of Environmental Affairs (known before as the Environmental Management Department) to address environmental concerns and issues. Also, created the Department of Municipal Aqueduct to address water supply problems and improve potable water distribution in the rural area of Carolina.

## **Socio-Economic Analysis**

According to official data from the U.S. Census Bureau, Carolina has a population of 186,076 persons (US Census 2000). That represents an increment of 4.7% in comparison to the 1990 census. The population density of Carolina is 4,105 persons per square mile, one of the highest on the island. An 87% of the population lives in the urban area, which has a total population of 161,160 persons divided between the



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following wards: Cangrejo Arriba, Sabana Abajo, Hoyo Mulas, Carolina Pueblo, Martín González, Trujillo Bajo and San Antón.

The unemployment rate in the Municipality is 7.1 %, according to official data from the Department of Work. That unemployment rate is a little bit higher if compared to the San Juan Metropolitan Region (6.7%), but is a low rate if compared to all Puerto Rico (10.1%). Of all the municipalities that integrate the San Juan Metropolitan Region, Carolina is the third municipality with the highest median income per family (\$23,412) besides Guaynabo (\$30,209) and Trujillo Alto (\$24,543), respectively. Carolina has a poverty rate of 30.7%, which is lower than the average poverty rate of Puerto Rico, 44.6% (U.S. Census Bureau, 2000). The industrial sectors that generate more employment in the Municipality are detailed commerce (26.8%), services (21.1%), and transportation and public utilities (14.8%); being the agricultural sector the least employment promoter.



## Wards of Carolina



## **Natural Resources**

### **Topography**

Carolina is located at the north-east coast of Puerto Rico. The topography consists of littoral-coast, floodplain valley and the mountains of the interior. Many acres of the littoral- coast in the northern area of Carolina consisted of wetlands and marshes that were filled during the 1950's for the construction of the Airport and for urban development. In the floodplain valley, the elevations range from 2 to 5 meters, therefore the valley becomes flooded during heavy rain periods. In the floodplain valley, at the north of Road PR-3, there is a small chain of mountains known as the San José hills with a maximum elevation of 64 meters. At south of Road PR-3 starts the mountain region of Carolina, with elevations that range from 150 to 450 meters. The annual precipitation in that area is approximately 100 inches per year, with some identified areas, which have slopes greater than 30 degrees. The Municipality developed a Land Use Plan for the rural area that include protection of eroded soils and sensitive watershed recharge areas.

### **Geology and Soils**

Volcanic rocks and unconsolidated Quaternary superficial deposits are the two mayor -types that occur in the region with some consolidated sedimentary rocks in the northern side, along the San José hills chain (USGS Water Resources Investigations Report 94-4198, 1996). Volcanic rocks of Cretaceous age are the most abundant rock type south of Río Grande de Loíza through the uplands. The superficial deposits of Quaternary age cover the Tertiary age formations in the northern part of Carolina. These superficial deposits consist of beach deposits, swamps deposits, alluvial deposits and blanket sands (USGS, 1996). Consolidated sedimentary rocks of the Miocene and Oligocene, located along the San José Hills, consist of aynamón and aguada limestone (USGS, 1996).

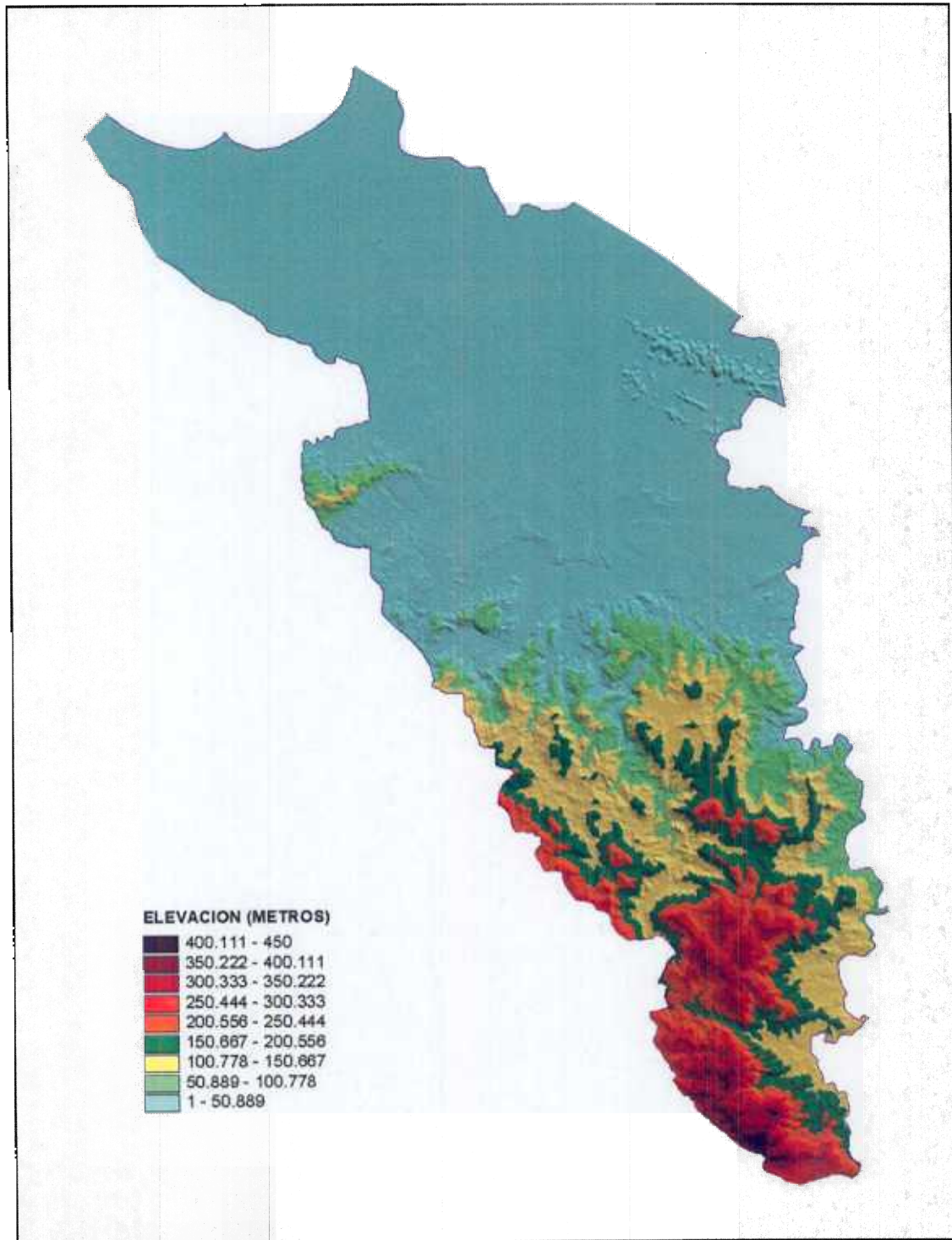
The soil summary associations and infiltration capacity obtained from soil maps published by the Natural Resource Conservation Service, formerly the Soil Conservation Service, are described below:

1. Swamps-Marshes association: Deep, very poorly drained soils on the coastal plains
2. Coloso-Toa-Bajura association: Deep, moderately well drained to poorly drained, nearly level soils on flood plains
3. Caguabo-Mucara-Naranjito association: Shallow and moderately deep, well drained, sloping to very steep soils on volcanic uplands

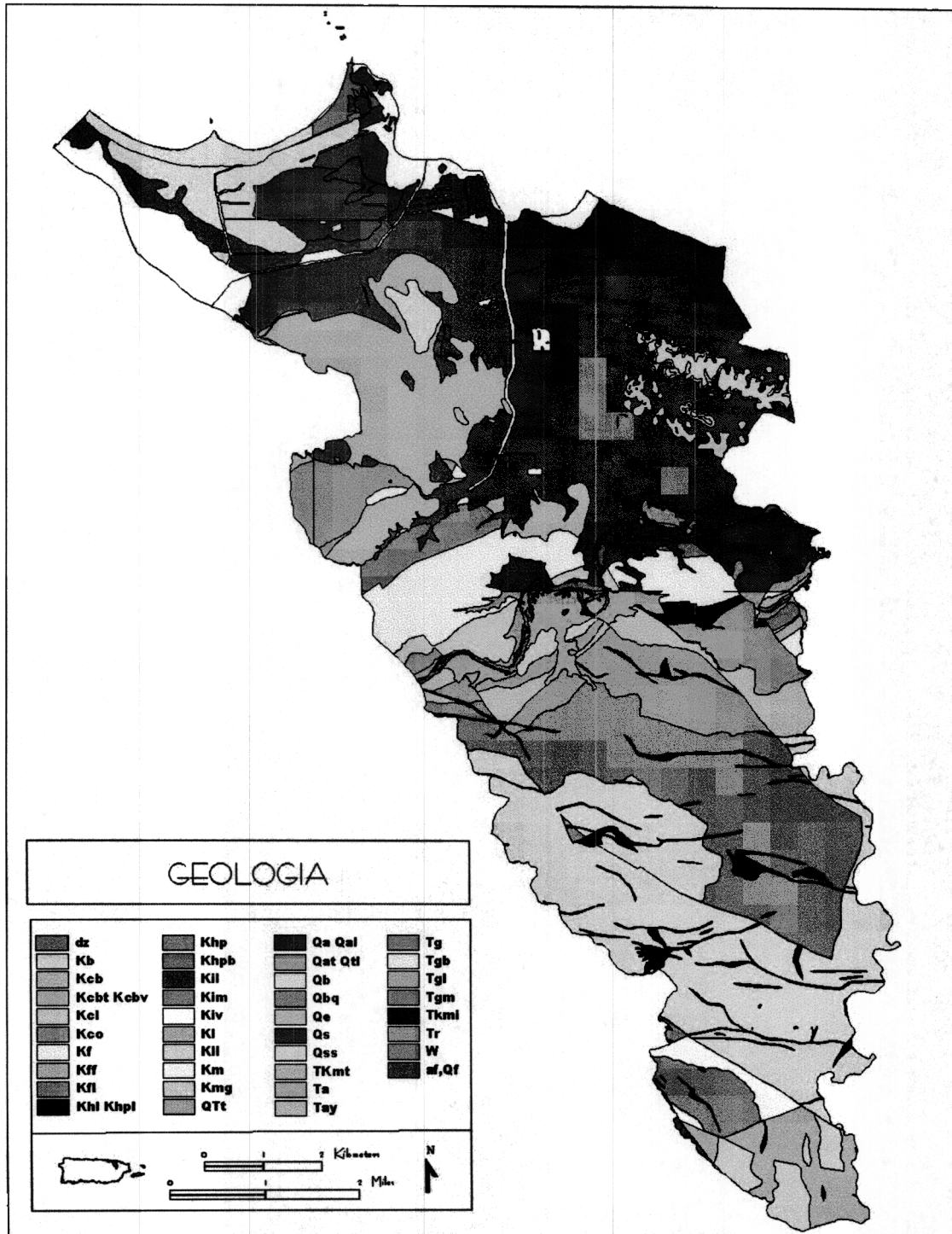




## **Topography of Carolina**



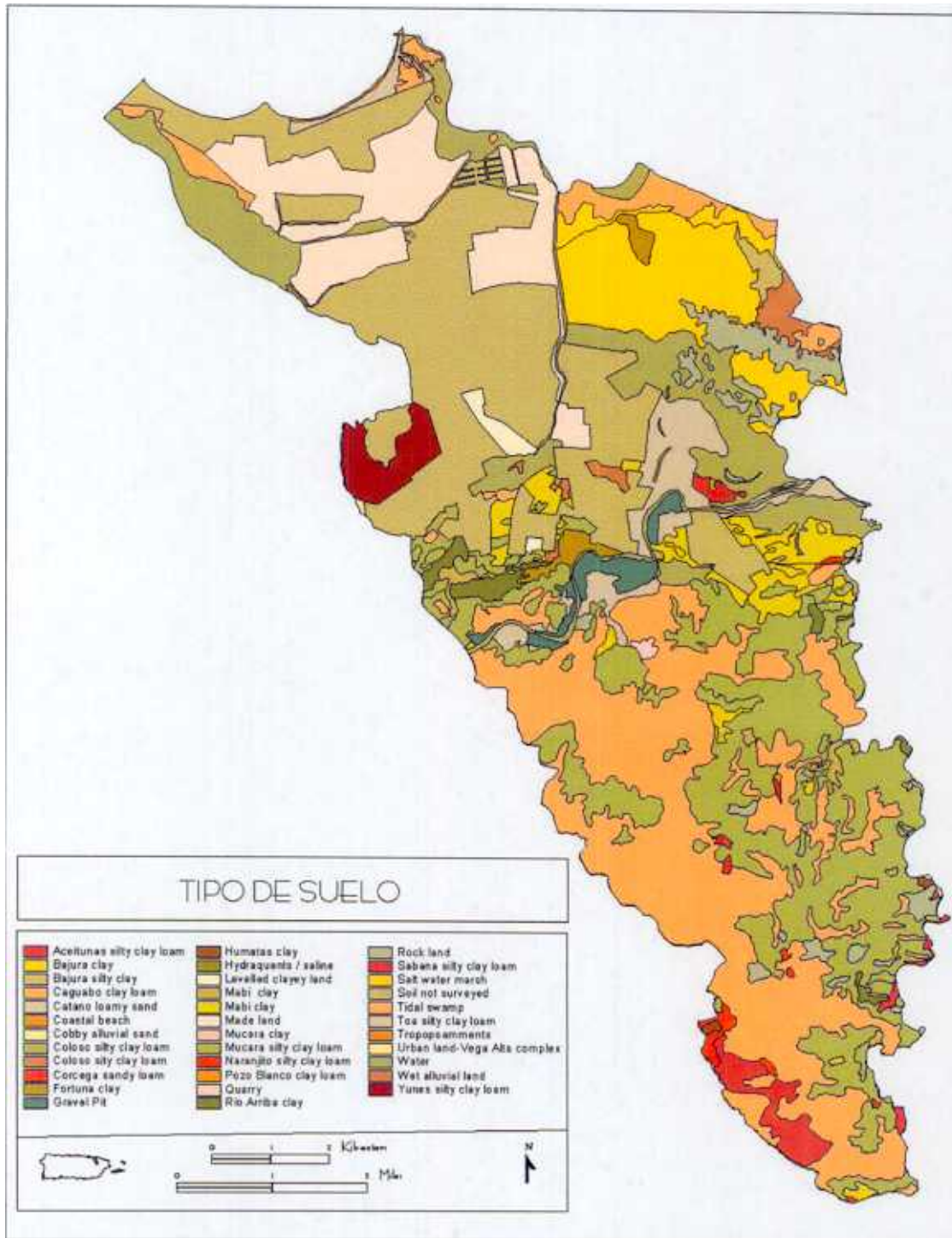
## Geology of Carolina





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**Solis of Carolina**



## **Natural Ecosystems**

The Municipality of Carolina has a rich diversity of biotic components and natural ecosystems. Beside the rivers and streams that will be mentioned later, Carolina also has sandy beaches in the northern coastal area, wetlands in the floodplain valley and along rivers and lagoons, and dense forested areas in the mountain region. In addition, Carolina has a cave system in San José Hills that are considered unique in the north-east area, like part of the north karst.

**Cave in San José Hill**

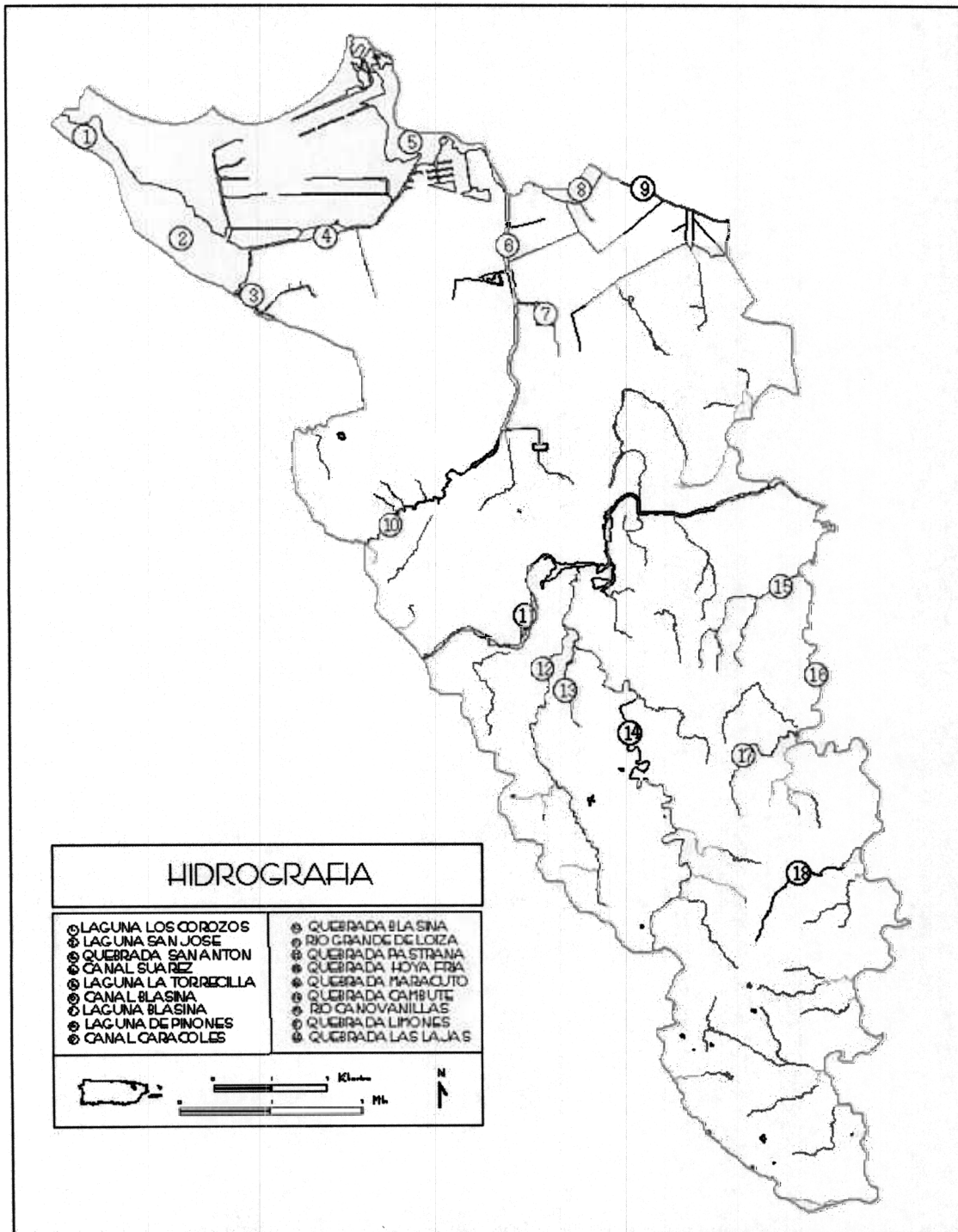


## **Hydrology**

The territory of Carolina lies between two watersheds: the Río Puerto Nuevo and the Río Grande de Loíza, occupying the later most of the territory. The Río Grande de Loíza watershed is the largest drainage basin in Puerto Rico (Webb and Soler-López, 1997). The rural area in the upper lands of Carolina drains mostly into the Loíza River. The principal creeks draining into the Río Grande de Loíza are Maracuto, Pastrana, Hoya Fría and Lagrimita. In the eastern border, the Canovanillas River, which also drains into Río Grande de Loíza, receives water from Cambute, Limones and Las Lajas creeks.

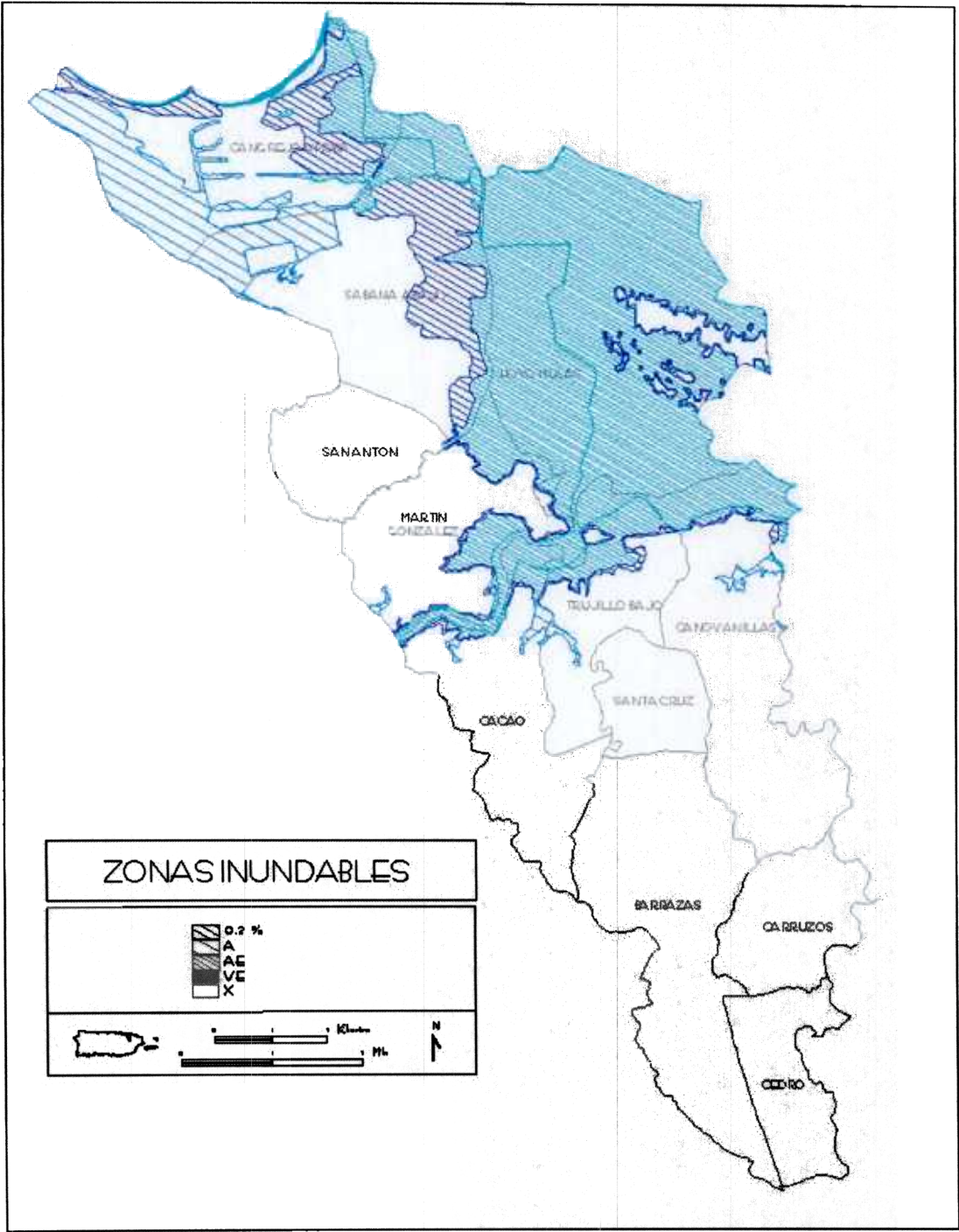
The urban area of Carolina drains mostly into the San Juan Bay Estuary System of the Río Puerto Nuevo watershed. In the west border, the San José Lagoon and Los Corozos Lagoon are located near the center of the estuary system. These water bodies have a surface area of approximately 1,129 acres or 457 ha. (SJBE Management Plan, 2000). In the south- west border, the San Antón creek drains into the San José Lagoon. The Suárez Canal, located on the eastern part of the San José Lagoon, connects the San José to La Torrecilla Lagoon through a 2.4 mile (3.9 km) long forested canal. The Blasina Creek, with respected tributaries including the Blasina Lake, crosses the center of the urban area of Carolina, draining in the Piñones Lagoon in the northern border.

## Hydrology of Carolina





**Flooding Areas of Carolina**



## **Stormwater Discharge Surface Waters**

Stormwater sewer outfalls are located along the Blasina Creek, including tributaries such as Monserrate Channel and Blasina Lake. Also, there are storm sewer outfalls that discharge into San Antón Creek, the Flamboyanes Channel in Los Angeles neighborhood and the Suárez Canal. There are also storm sewers that discharge into smaller streams within the urban area, but mostly all stormwater runoff will eventually reach the water bodies mentioned above. The exact point of location for the outfalls of the storm water sewers will be determined as part of this Program.

## **Water Quality Concerns**

The Municipality of Carolina requested to the US Geological Survey to conduct a comprehensive surface and ground water resource assessment and water quality analysis of streams in order to ensure an adequate supply of safe drinking water in upland communities and supply during drought periods. Thematic maps were developed to delineate the hydrologic and stream bacteriological (sanitary) conditions, and to define the water bearing properties of potential aquifers.

Water quality standards (WQS) for surface waters in Puerto Rico have been established by the Puerto Rico Environmental Quality Board (EQB) on the basis of designated uses, such as drinking, irrigation, fishing, swimming or recreation, for which water quality shall be maintained and protected. The following table illustrates the current classification designated to the surface waters around the urban area of Carolina:

<b>Classification (EQB, 1990)</b>	<b>Designated Use</b>	<b>Water Bodies</b>
SD	Surface waters intended for use as raw source of public water supply, for propagation and preservation of desirable aquatic species, and for primary (swimming) and secondary (boating and fishing) contact recreation, but precluding primary contact if the waters contain pathogenic organisms at a concentration greater than 2,000 colonies/100 mL of fecal coliforms.	Blasina Creek (including respective tributaries), San Antón Creek.
SB	Coastal and estuarine waters intended for use in primary and secondary contact recreation and for the propagation and preservation of desirable species.	Suárez Canal, La Torecilla Lagoon, Piñones Lagoon.
SC	Coastal waters intended for uses where the human body may come in indirect contact with the water and for use in propagation and preservation of desirable species.	San José Lagoon.



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One of the mayor sources of contamination in the urban area are illegal discharges of sewage to the storm water drains, especially within the older sectors of the city of Carolina. In addition, there are overflows from sewers mains into the storm water drains as a result of malfunctioning sanitary sewer ejectors or clogged mains, ruptured sewer mains and leakage from sewer mains into the local aquifer.

Baseline data on the sanitary quality of surface waters within or with flow into the Municipality of Carolina are primarily from the long term monitoring stations at Blasina Creek, near Carolina, and Río Grande de Loíza, near Trujillo Alto (USGS Stations 50050300 and 50059100, respectively). Also, at selected estuary stations in Piñones, La Torrecilla and San José Lagoons (stations 50050335, 50050350, 50050355, 50049720, 50049760 and 50049820, respectively) for the periods of 1990-92 and 1994-95. Systematic sampling for selected physical, chemical and bacteriological properties have been done at these stations by the USGS in cooperation with the Environmental Quality Board (EQB), and data are available in the USGS annual Water Data Report series.

Using this historical database to initially assess the sanitary quality of streams and estuaries in the Carolina area, the following was determined (Rodríguez-Martínez, et.al., 2002):

1. At the Blasina Creek long term sampling station, there has been no substantial improvement towards achieving the Puerto Rico sanitary water quality goals established for the Class SD waters, even though the Vistamar, Villa Carolina and Rolling Hills waste treatment plants were closed. Those primary treatment plants discharged their effluents to the Blasina Creek from the 1960's through the middle 1980's;
2. The estuary portion of the Blasina does not appear to meet the sanitary quality goals established for Class SB waters, at least in its junction to La Torrecilla Lagoon;
3. The San José Lagoon do not meet the Class SC goal for estuarine waters;
4. La Torrecilla Lagoon do not meet the Class SB standard for estuarine waters;
5. Piñones Lagoon comply with Class SB goal in its northern portion;
6. During rainfall runoff events the sanitary quality in the lagoons deteriorates significantly with concentrations of fecal coliform increasing from 2 to 100 higher than the quantities found during dry seasons conditions (Webb and Gómez-Gómez, 1998); and
7. These baseline fecal coliform data are insufficient to identify sources of fecal contamination within the Municipality.

In 1999, citizens from the Vistamar Marina residential area, adjacent to La Torrecilla Lagoon, formed a group known as "Ciudadanos del Mangle", to seek solutions to the overflows from the Vistamar sewage collection system as well as other environmental problems affecting their community. These groups contracted a private laboratory to sample and analyze the quality of the receiving waters affected by the discharges. The analysis revealed fecal coliform concentrations in the Guadalquivir and Managua lakes,



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two men made embayment in La Torrecilla Lagoon, as high as 62,500 colonies/100mL and 1,400 colonies/100mL, respectively (High Technology Laboratory, 1999). The EP A identified then an existing problem of bypasses from the pumping stations. The San Juan Bay Estuary Program recommended in their Management Plan a strategy to address this problem (SJBEP, 2000).

Other pollutants that also reach the surface waters through the storm water sewers include petroleum hydrocarbons, metals, sediments, and pollutants related to commercial and industrial processes and practices. To address this problem, the Municipality of Carolina has been extremely active trying to enforce compliance at identified entities that are violating environmental regulations regarding discharges to surface waters.

In 2001, the Municipality sued the Puerto Rico Aqueduct and Sewer Authority (PRASA) regarding the contamination of the Blasina Lake. Recently, the Court Decision favored our arguments and PRASA will have to comply and eliminate discharges of sewage to the lake due to overflow problems. The Court Decision also orders a *Mandamus* to the EQB and the Department of Natural and Environmental Resources regarding the water quality protection of the Blasina Creek and tributaries. In 2002, the Municipality sued the Ports Authority regarding the excessive noise situation that affects the community nearby the Airport and also for the contamination of surface waters within the Airport, in the territory of Carolina. This case is still pending trial.



## Management Plan Program Components

### Public Education and Outreach

**BMP1:** Promote educational activities to build awareness and appreciation of our natural resources.

**Justification:** It is important to educate the public on the functions and value of the natural ecosystem and to make them understand the impacts of human actions in nature's delicate balance. The Municipality of Carolina will enhance its educational efforts to encourage active involvement of the citizens in the protection and restoration of the water bodies within Carolina.

Activities	Indicators	Schedule/Date of Completion	Person/Group Responsible
Continue to offer presentations and talks to schools and communities regarding the protection and conservation of the environment	Number of conferences offered	Continuous activity/ 10 per year	Office of Environmental Affairs
Evaluate and distribute existing educational informational materials (brochures, posters, bumper stickers, etc.) and develop new material that include: <ul style="list-style-type: none"><li>• A brochure on "Things that you can do to restore and conserve the Blasina Canal"</li><li>• A guide on habitats, recreational facilities and activities within the Julia de Burgos Lineal Park</li><li>• The environmental status of the Blasina and Suárez Canals</li></ul>	Number of educational materials distributed  Number of new material developed	Continuous activity/5,000 per year  Continuous activity	Office of Environmental Affairs





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**BMP2: Post educational and interpretive signs at highly visible heavy traffic areas throughout problems.**

**Justification:** The Municipality of Carolina paid a water quality study in 1998 for the Blasina Lake in order to investigate allegations of possible contamination to that water body. The results of that study made us concern about the lack of information to the public regarding the water quality of the Blasina Creek and tributaries. Even though the Municipality recognizes the value and function of the water bodies connecting the San Juan Bay Estuary System, it is also important to let the public knows about the environmental problems of certain water bodies.

Activities	Indicators	Schedule/Date of Completion	Person/Group Responsible
Identify areas where tributaries and water bodies are visually exposed and frequented by the public, such as waterfronts, bridges, roads, recreational parks and marinas.	Number and location of identifies areas	August 2009	Office of Environmental Affairs
Design and produce warning signs regarding contamination problems in the Blasina Creek and tributaries	Number of Signs produced and installed	February 2009	Office of Environmental Affairs/Public Works Department
Design and produce educational and informational signs which identify components of the system and highlight its function and value.	Number of signs produced and installed in identified areas	May 2009	Office of Environmental Affairs/Press and Communication Office

**BMP3: Continue the implementation of the recycling programs and waste reduction in the Municipality of Carolina.**

**Justification:** It is important to educate the public on the natural ecosystem functions and to understand the impacts of human actions in nature's delicate balance. The Municipality of Carolina will enhance its educational efforts to encourage active involvement of the citizens in the protection and restoration of the water bodies within Carolina.



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Activities	Indicators	Schedule/Date of Completion	Person/Group Responsible
Design and implement a massive educational campaign among all the citizens regarding waste reduction and recycling	Number of educational materials distributed	Continuous activity/5,000 per year	Press and Communication Office/Solid Waste Management Department
Increase the participation of businesses and industries recycling programs	Number of businesses and industries participating	Continuous activity	Solid Waste Management Department

### Public Involvement/Participation

**BMP4:** Establish activities to provide citizens with effective and organized volunteer opportunities to support awareness regarding the protection of surface waters.

**Justification:** Increasing environmental awareness regarding the conservation of our natural ecosystems, which include the protection of surface waters, have been a priority in the Municipality of Carolina. It is important to provide the means and opportunities that will encourage and facilitate active involvement by citizens to the process.

Activities	Indicators	Schedule/Date of Completion	Person/Group Responsible
Coordinate cleanup activities with volunteer groups and communities	Number of activities realized per year	Continuous activity/ two per year	Office of Environmental Affairs
Celebrate April as the "Month of the Environment" and promote the participation of volunteer groups regarding the protection of natural ecosystems	Number of volunteer groups participating	Yearly	Office of Environmental Affairs
Coordinate reforestation activities in target areas	Number of reforestation activities with communities	Yearly	Office of Environmental Affairs
	Number of trees planted	1,000 trees per year	



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Activities	Indicators	Schedule/Date of Completion	Person/Group Responsible
Develop an annual Aquatic Debris Clean-up Event	Number of volunteer groups and community members participating	Yearly	Office of Environmental Affairs/Office of Community Participation/Public Works Department

**BMP5: Identify and promote low-impact and nature-oriented activities within selected areas of Carolina in order to encourage the recreational uses of the natural resources.**

**Justification:** Carolina has a rich diversity of natural resources that can be use as a tool to instill a strong sense of stewardship among the citizens. Its lagoons, wetlands, sandy beaches and other natural sites of Carolina offer recreational areas where citizens can interact with nature.

Activities	Indicators	Schedule/Date of Completion	Person/Group Responsible
Design an interpretative trail in Julia de Burgos Lineal Park giving priority to the biotic components and habitats along the Blasina Canal (mangroves, birds, reptiles, etc.)	Number of routes identified  Number of signs indicating biotic components of the water body	One route per year  At least 10 signs will be posted by 2009	Office of Environmental Affairs  Office of Environmental Affairs/ Public Works Department
Develop an environmental educational center in the Public Beach of Carolina	Establishment of the Educational Center	September 2009	Office of Environmental Affairs/Project Management Department



## **Illicit Discharge Detection Elimination**

**BMP6:** *Developed a storm drain system map of the urban area of Carolina.*

**Justification:** This map will aid the Municipality of Carolina in targeting outfalls with suspicious discharges for more in-depth inspection and monitoring. It will also help coordinate management activities to remove illicit connections.

<b>Activities</b>	<b>Indicators</b>	<b>Schedule/Date of Completion</b>	<b>Person/Group Responsible</b>
Map all storm drains outfalls along the streams of the urban area with a GPS.	Number of outfalls plotted with the GPS	June 2011	Geographic Information Unit
Identify suspicious discharges from the outfalls	Number of suspicious discharges identified	June 2008	Geographic Information Unit
Prepare an Ordinance that decree that all new development must give the plan in digital format of the pluvial sewage system.	Preparation and submission of the Ordinance	December 2008	Physics and Environmental Planning Office
Train the permitting reviewers of OMPU the regarding the Ordinance.	Number of permitting reviewers	January 2009	Physics and Environmental Planning Office/ Municipal Office of Urban Permits (OMPU)

**BMP7:** *Develop an inspection program to identify wastewater discharges into the storm collection system.*

**Justification:** The Blasina creek is not complying with sanitary quality goals determined by the EQB. Wastewater discharges to the storm collection sewers due to collapsed or obstructed sewage pipelines will be identified giving priority to the Blasina creek and its tributaries, which is a high-risk area.



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<b>Activities</b>	<b>Indicators</b>	<b>Schedule/Date of Completion</b>	<b>Person/Group Responsible</b>
Perform a dry weather inspection of the outfalls in order to identify illegal connections	Number of dry weather monitoring activities performed	Trimester/ Continuous activity	Public Works Department
Perform a dry weather inspection of stormwater inlets and sewers to identify illegal discharges	Number of dry weather monitoring activities performed  Number of citizens complaints reporting illegal connections	Trimester/ Continuous activity  Continuous activity	Public Works Department
Perform field tests (color test) in the sewage system in order to identify collapsed sewage, pipelines	Number of field test conducted in high risk areas (Vistamar, Villa Fontana, 4th, 5th and 6th Sections of Villa Carolina)	High risk areas: Vistamar- January 2009 Villa Fontana – June 2009 4th Sec. Villa Carolina- December 2009 5th Sec. Villa Carolina-March 2010 6th Sec. Villa Carolina September 2010	Environmental Quality Board (EQB) /PRASA/Office of Environmental Affairs
Notify PRASA about collapsed sewage pipelines encountered.	Number of notifications about situations made to PRASA		Office of Environmental Affairs

**NOTE:** This schedule is subject to change depending on coordination with EQB and PRASA to perform test.





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**BMP8: Identify failing septic systems in the urban area of Carolina.**

**Justification:** The urban area withholds seven (7) designated "Special Communities", according to the Office of the Governor. Five of these communities lacks sewage systems and dispose their sanitary waste in septic leaching systems. The cumulative effects of numerous small septic systems, many of them improperly maintained, may result in the contamination of surface waters. This goal will help the Municipality prioritize target areas and make any necessary arrangements with the State Government to address the situation.

Activities	Indicators	Schedule/Date of Completion	Person/Group Responsible
Perform an inventory of failing septic systems in the Special Natural Resources Communities.	Number of dry weather monitoring activities performed	Trimester/ Continuous activity	Public Works Department
Prepare a map addressing failing septic systems	Number of failing septic systems identified in GIS	June 2009	Public Works Department/ Geographic Information unit
Prepare an Ordinance prohibiting leaching septic systems in areas that have sewage connection accessibility that include fines for non-compliance.	Preparation and submission of the Ordinance	October 2008	Physics and Environmental Planning Office

The costs associated with these activities are still to be determined.

### **Construction Site Runoff Control**

**BMP9: Develop and implement ordinances to address construction site runoff control in development or redevelopment projects proposed in Carolina.**

**Justification:** As an Autonomous Municipality, Carolina promulgates land use plans and regulates permitting regarding land uses and certain construction projects. This will aid the Municipality to implement necessary actions in order to control sediments or any other possible pollutants reaching surface waters during runoff.



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<b>Activities</b>	<b>Indicators</b>	<b>Schedule/Date of Completion</b>	<b>Person/Group Responsible</b>
Prepare an Ordinance requesting a Construction Site Runoff Control Plan (RCP) as part of the permitting process if project is within 100 feet within a water body that include fines for non-compliance with that Plan.	Preparation and submission of the Ordinance	December 2008	Physics and Environmental Planning Office
Create an Environmental Compliance Program to address site inspections for compliance.		December 2008 (The schedule can change depending on funds availability)	Physics and Environmental Planning Office
Train the permitting reviewers of OMPU the regarding the Ordinance.	Number of permitting reviewers trained Number of RCP requested and submitted to OMPU	May 2009	Physics and Environmental Planning Office /(OMPU)
Train the compliance inspectors of OMPU and the Environmental Compliance Program regarding the Ordinance and runoff control measures.	Number of inspectors trained	June 2009	Physics and Environmental Planning Office
Perform inspections to verify implementation of RCP submitted.	Number of inadequate site plans reported	Continuous activity	Office of Environmental Affairs/Physics and Environmental Planning Office /(OMPU)



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**BMP10: Develop an ordinance to adopt the Regulation No.25 of the Puerto Rico Planning Board regarding Cut, Pruning and Reforestation of Trees in Puerto Rico.**

**Justification:** The Municipality of Carolina has stipulated a public policy regarding the improvement of the environment and quality of life in stressed areas and is implementing urban reforestation as part of the strategies. This will aid the Municipality to implement actions regarding preservation of natural vegetation and reforestation in construction sites.

Activities	Indicators	Schedule/Date of Completion	Person/Group Responsible
Prepare an Ordinance requesting the adoption of Regulation No.25 of the Planning Board and include fines for non-compliance	Preparation and submission of the Ordinance	February 2009	Physics and Environmental Planning Office
Train the permitting reviewers of OMPU regarding the Ordinance and a Planting Plan for construction	Number of permitting reviewers trained Number of Planting Plans submitted	March 2009  Continuous activity activities	Physics and Environmental Planning Office /OMPU
Perform inspections to verify conservation of natural vegetation and reforestation activities in construction sites	Number of sites inspected Number of non-compliance reported	April 2009 Continuous activity	Physics and Environmental Planning Office /OMPU

The costs associated to these activities are still to be determined.

**Post Construction Storm Water Management in New Development and Redevelopment**

**BMP11: Protect areas within the upland watershed through change in zoning codes.**

**Justification:** Criteria will be established to zone the rural area of Carolina. By zoning sensitive areas susceptible to erosion if disturbed, the Municipality will protect for new development needed open space for the future citizens of Carolina.



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Activities	Indicators	Schedule/Date of Completion	Person/Group Responsible
Identify areas within the upland rural region of Carolina that need zoning in order to avoid erosion problems and possible land slide.	Number of areas identified	October 2008	Physics and Environmental Planning Office
Propose new zoning in the Territorial Plan Revision that is submitted to the Planning Board.	New zoning proposed	June 2008	Physics and Environmental Planning Office/Planning Department

### **Pollution Prevention/Good Housekeeping for Municipal Operations**

**BMP12:** *Identify areas where illegal dumping is taking in order to develop an inventory.*

**Justification:** By creating an inventory of sensitive dumping areas the Municipality will be able to target the problem source and therefore will be able to implement corrective actions such as clean up days and community awareness campaigns.

Activities	Indicators	Schedule/Date of Completion	Person/Group Responsible
Identify illegal dumping areas to develop inventory and prioritized it according to the quantity of accumulated materials and sensitivity to storm water runoff.	Number of dumping areas identified	December 2009	Public Works Department/ Department of Solid Waste Management
Coordinate at least two clean up days a year in priority areas as stated in the inventory.	Number of clean up days performed	Continuous activity	Public Works Department/ Department of Solid Waste Management
Provide each of the inventoried areas with "no dumping" signs	Number of signs posted	Continuous activity	Public Works Department/ Department of Solid Waste Management



**BMP13: Implement measures to control illegal dumping activities, especially near water bodies.**

**Justification:** By disposing waste illegally at no cost at clandestine sites, dumpers avoid the high cost of legal disposal in the municipal landfill. The Municipality of Carolina is doing a great effort trying to eliminate clandestine dump sites, achieving success in certain sites.

Activities	Indicators	Schedule/Date of Completion	Person/Group Responsible
Enforce Puerto Rico's antilittering law (No. 11 of 1995).	Number of fines given	Continuous activity At least 30 per year	Carolina Municipal Police
Coordinate enforcement campaigns with the Municipal Police in critical areas.	Number of campaigns performed	Continuous activity At least 3 per year	Carolina Municipal Police/Department of Solid Waste Management
Provide each of the critical areas with "no dumping" signs.	Number of signs posted	Continuous activity	Public Works Department/ Department of Solid Waste Management

**BMP14: Develop an inventory of garages auto-shops and other automobile related businesses.**

**Justification:** By creating an inventory of automobile related businesses the Municipality will be able to lead an educational campaign that will serve to prevent the possibility of spills that ultimately reach storm water runoff.

Activities	Indicators	Schedule/Date of Completion	Person/Group Responsible
Identify automobile related businesses and map them with the GPS.	Number of businesses plotted with the GPS	December 2009	Geographic Information Unit/ Physics and Environmental Planning Office
Provide business owners and operators with educational materials and orientations	Number of businesses reached	Continuous activity	OMPU/Physics and Environmental Planning Office/ Office of





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regarding proper disposal of typical automobile-related fluids such as oil, antifreeze and gasoline, among others.			Environmental Affairs
Provide each of the inventoried areas with "no dumping" signs.	Number of signs posted	Continuous activity	Department of Solid Waste Management/Public Works Department

**BMP15: Develop a schedule for storm drain cleaning and debris removal from storm water open channels.**

**Justification:** Aquatic debris not only affects the aesthetic value of water bodies, but also poses health and environmental risks to all human and plant life within the urban estuarine ecosystem. It is important for the Municipality to reduce the risks to public health related to the presence of debris in water bodies.

Activities	Indicators	Schedule/Date of Completion	Person/Group Responsible
Prepare an inventory of water bodies that will need cleaning and debris removal, giving priority to clogged systems.	Number of water bodies that need cleaning	January 2008	Public Works Department/Office of Environmental Affairs
Develop a schedule to clean up the water bodies on a regular basis	Number of cleaning campaigns performed	Continuous activity At least every two years	Public Works Department/ Office of Environmental Affairs
Install "no dumping" signs in critical areas	Number of signs posted	Continuous activity	Public Works Department/Office of Environmental Affairs/

